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Remarks/Arguments:

Applicant wishes to thank the Examiner for his detailed comments. As Examiner has chosen to group his comments by section, Applicant shall address each of these sections and points in turn.

Claim Rejections - 35 USC § 102

Examiner has stated:

"Claims 1,3, 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,783,489 to Kaufman et al.

"Kaufman et al. teach a method of polishing using CMP comprising providing a slurry of AI2O3 (Col. 4, Lines 47-51) adjusting the concentration of H2O2 in the slurry to 6-12% (Col. 4, Lines 18-33) and balancing mechanical polishing action. (Cited range of 5-10 wt % overlaps claimed range of 6-12 vol%).

"Note that the use of the slurry for the manufacture of magnetic heads containing Co Fe is not given patentable weight because the recitation occurs only in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone..."

The amended Claim 1 now recites the new limitation of

"A) providing magnetic heads which include CoFe elements;"

The Kaufman reference recites:

"The metal vias and contacts may be filled with various metals and alloys including titanium (Ti), titanium nitride (TiN), tantalum (Ta), aluminum copper (Al--Cu), aluminum silicon (Al--Si), copper (Cu), tungsten (W), and combinations thereof. The metal vias and contacts generally employ an adhesion layer such as titanium nitride (TiN) and/or titanium (Ti) to adhere the metal layer to the SiO₂ substrate." (col. 1, lines 38-44)

and:

"In particular, the chemical mechanical polishing slurry of this invention has been found to exhibit excellent polishing selectivities when used to polish a substrate including titanium, titanium nitride, and aluminum alloy containing layers in a single step, multiple metal layer chemical mechanical polishing process." (col. 3, lines 47-53)

The slurry formulated by Kaufman is primarily for use in the semi-conductor industry, is not useful for CoFe magnetic head elements, and in fact has been found

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to be harmful. Specifically, the slurry of Kaufman includes "at least two oxidizers." (col. 4, lines 18-19), of which the first is preferably hydrogen peroxide, but also includes ammonium persulfate as a preferred second oxidizer. (col. 4 line 39). The present inventors have personally tried the use of two oxidizers in the early stages of their experiments, but found that the presence of a second oxidizer quickly damaged the CoFe elements, which are susceptible to corrosion by oxidation. As pointed out in the present specification, CoFe is more chemically active than other materials commonly used in the manufacture of magnetic heads, and is easily damaged by using conventional CMP processes. In fact, the specification documents the corrosion which has resulted to CoFe elements by use of standard CMP processes in the FIGS. 5-7.

Since manufacture of magnetic heads is a smaller market than that of semiconductors, the processes for CMP of magnetic head components is less well known than for semi-conductors. Additionally, the use of CoFe elements is relatively new in the magnetic head fabrication art, thus CMP processes pertaining to CoFe elements are even less well known than for magnetic head elements in general. The inventors, who are highly skilled in the art, inform me that it took more than one year to arrive at this proper method for polishing CoFe without corrosion.

Thus, Kaufman does not teach nor fairly suggest that the CMP slurry of his invention is useful for elements of CoFe composition and it cannot be said that the present method is either anticipated or made obvious by the cited references, either alone or in combination.

Thus, applicant respectfully asserts that the present invention is not anticipated by the Kaufman reference. Applicant respectfully requests that the rejection be withdrawn and Claim 1 be allowed.

Examiner has stated:

"Regarding Claim 3, Kaufman et al. teach a polishing pressure of 5-7 psi

"Regarding Claim 6, Kaufman et al. teach a particle size of 50-500 nm. (Col. 5, Lines 50-54)

"Regarding Claim 7, Kaufman et al. teach a pH for the slurry in the range of 4-6. (Col. 7, Lines 17-21)"

Claims 3, 6, and 7 are dependent on Claim 1, and all include by their dependence the assertedly novel and non-obvious feature of providing CoFe elements which are then polished by the method of the present invention. Therefore, Applicant respectfully asserts that these claims are also not anticipated by the cited reference. Applicant therefore respectfully requests that the rejection be withdrawn and Claims 3, 6, and 7 be allowed.

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Claim Rejections - 35 USC § 103

Examiner has stated:

- 5 “Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,783,489 to Kaufman et al. in view of U.S. Patent 5,811,355 to Jordan
“Regarding Claim 4,” (should be ?? LG) “Kaufman et al. teach the method of the invention substantially as claimed but do not expressly teach a table speed of 55-90 rpm.
“Kaufman et al. teaches 45 rpm table speed as an example. (Co I. 9, Lines 1-52)
10 However, Jordan teaches polishing a magnetic head using alumina particles...”

- Claim 2 is dependent on Claim 1, and include by its dependence the assertedly novel and non-obvious feature of providing CoFe elements which are then polished by the method of the present invention. Therefore, Applicant
15 respectfully asserts that this claim is not made obvious by the cited combination of references. Applicant therefore respectfully requests that the rejection be withdrawn and Claim 2 be allowed.

Examiner has stated:

- 20 “Claim 4 is rejected under 35 U.S.C. 103 {a} as being unpatentable over U.S. Patent 5,783,489 to Kaufman et al. in view of U.S. Patent 6,066,028 to Cheng et al.
“Regarding Claim 4, Kaufman et al. teaches the method of the invention substantially as claimed but do not teach the use of a corrosion inhibitor such as benzotriazole (BTA).
25 “However the use of benzotriazole compounds, as a corrosion inhibitor is well known in the polishing art. For example, Cheng et al. teach that a slurry containing benzotriazole is useful as an inhibitor...”

- Claim 4 is dependent on Claim 1, and include by its dependence the assertedly novel and non-obvious feature of providing CoFe elements which are then polished by the method of the present invention. Therefore, Applicant
30 respectfully asserts that this claim is not made obvious by the cited combination of references. Applicant therefore respectfully requests that the rejection be withdrawn and Claim 4 be allowed.

- 35 Examiner has stated:

- “Claim 5 is rejected under 35 U.S.C. 103 {a} as being unpatentable over U.S. Patent 5,783,489 to Kaufman et al. in view of 6,786,944 to Hattori et al.
40 “Regarding Claim 5, Kaufman et al. teaches the method of the invention substantially as claimed but do not teach the use of isothiazolone as a biocide. Hattori teaches a method of polishing a substrate comprising polishing using CMP comprising providing a slurry of Al₂O₃ (Col. 2, Lines 55-57) adjusting the concentration of H₂O₂ in the slurry (Col. 7, Lines 55-60) and

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balancing mechanical polishing action. Hattori et al teaches isothiazolone may be used as a preservative....”

5 Claim 5 is dependent on Claim 1, and include by its dependence the assertedly novel and non-obvious feature of providing CoFe elements which are then polished by the method of the present invention. Therefore, Applicant respectfully asserts that this claim is not made obvious by the cited combination of references. Applicant therefore respectfully requests that the rejection be withdrawn and Claim 5 be allowed.

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New Claim 20 is based on disclosure from page 9 of the present specification. No new matter has been introduced, and the subject matter is assertedly novel and non-obvious in view of any of the cited references. Applicant respectfully requests that new Claim 20 be allowed.

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Conclusion:

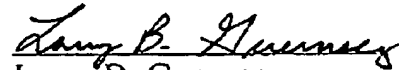
Applicant has endeavored to put this case into complete condition for allowance. It is thought that the current amendments have overcome the §102 and §103 rejections, or that these rejections were unfounded on the references cited. Applicant therefore respectfully asks that the rejections be withdrawn and that allowance of all claims presently in the case now be granted.

If the Examiner would like to discuss any of the points involved in the Response, he is urged to contact Applicant's Attorney at the numbers included below.

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